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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/063,575	05/03/2002	Ho-Ming Tong	8318-US-PA	9757

31561 7590 04/11/2003

JIANQ CHYUN INTELLECTUAL PROPERTY OFFICE  
7 FLOOR-1, NO. 100  
ROOSEVELT ROAD, SECTION 2  
TAIPEI, 100  
TAIWAN

EXAMINER

VU, QUANG D

ART UNIT	PAPER NUMBER
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2811

DATE MAILED: 04/11/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/063,575

Applicant(s)

TONG ET AL.

Examiner

Quang D Vu

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-36 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 13-22, 24-29 and 31-34 is/are allowed.
- 6) ☒ Claim(s) 1-12, 23, 30, 35 and 36 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_.

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## DETAILED ACTION

### *Specification*

The specification is objected to as failing to provide proper antecedent basis for the claimed subject matter. See 37 CFR 1.75(d)(1) and MPEP § 608.01(o). Correction of the following is required:

The specification never discloses the solder block material and the wettable layer material may diffuse into each other as claimed in claim 23.

The specification never discloses the solder block material and the wettable layer material may diffuse into each other as claimed in claim 30.

### *Claim Rejections - 35 USC § 112*

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 1-12, 23, 30, 35 and 36 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1, in lines 1-3, the phrase "...the contact interface between the under-ball metallic layer and the contact pad is made from a material containing copper..." is unclear. The specification discloses the UBM (142) formed on the passivation layer (114) and the bonding pad (116). The specification also disclose the layer (120) of the UBM (142) is made of TiW or Cr and the bonding pad (116) is made of Cu or CuAl. The specification never discloses the

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contact interface between the under-ball metallic layer and the contact pad is made from a material containing copper.

Claim 7, in lines 1-3, the phrase "...the contact interface between the under-ball metallic layer and the contact pad is made from a material containing copper..." is unclear. The specification discloses the UBM (142) formed on the passivation layer (114) and the bonding pad (116). The specification also discloses the layer (120) of the UBM (142) is made of TiW or Cr and the bonding pad (116) is made of Cu or CuAl. The specification never discloses the contact interface between the under-ball metallic layer and the contact pad is made from a material containing copper.

Claim 35, in lines 1-3, the phrase "...the contact interface between the under-ball metallic layer and the contact pad is made from a material containing copper..." is unclear. The specification discloses the UBM (142) formed on the passivation layer (114) and the bonding pad (116). The specification also discloses the layer (120) of the UBM (142) is made of TiW or Cr and the bonding pad (116) is made of Cu or CuAl. The specification never discloses the contact interface between the under-ball metallic layer and the contact pad is made from TiW alloy.

Claim 36, in lines 1-3, the phrase "...the contact interface between the under-ball metallic layer and the contact pad is made from a material containing copper..." is unclear. The specification discloses the UBM (142) formed on the passivation layer (114) and the bonding pad (116). The specification also discloses the layer (120) of the UBM (142) is made of TiW or Cr and the bonding pad (116) is made of Cu or CuAl. The specification never discloses the contact interface between the under-ball metallic layer and the contact pad is made from Cr.

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Claim 23, in lines 3-4, the phrase "...the solder block material and the wettable layer material may diffuse into each other" is unclear as it is being referred to the solder block material and the wettable layer material may or may not diffuse into each other.

Claim 30, in lines 3-4, the phrase "...the solder block material and the wettable layer material may diffuse into each other" is unclear as it is being referred to the solder block material and the wettable layer material may or may not diffuse into each other.

***Allowable Subject Matter***

3. Claims 1 and 7 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, second paragraph, set forth in this Office action.

4. Claims 13-22, 24-29 and 31-34 are allowed.

5. The following is a statement of reasons for the indication of allowable subject matter:

The most closely related art, US Patent No. 6,249,044 to Kao et al. and US Patent No. 5,767,010 to Mis et al. Kao et al. and Mis et al. do not anticipate or render the claimed invention such as a chip structure having bumps thereon, comprising: an adhesion layer over the bonding pads, wherein material forming the adhesion layer is titanium-tungsten alloy; a barrier layer over the adhesion layer, wherein material forming the barrier layer is nickel-vanadium alloy; a wettable layer over the barrier layer, wherein material forming the wettable layer includes copper. The second major difference between the claimed invention and the prior art is a chip structure having bumps thereon, comprising: an adhesion layer over the bonding pads, wherein material forming adhesion layer is chromium; a barrier layer over the adhesion layer, wherein material

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forming the barrier layer is nickel-vanadium alloy; a wettable layer over the barrier layer, wherein material forming the wettable layer includes copper.

***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Quang D Vu whose telephone number is 703-305-3826. The examiner can normally be reached on Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Thomas can be reached on 703-308-2772. The fax phone numbers for the organization where this application or proceeding is assigned are 703-308-7722 for regular communications and 703-308-7722 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

qv  
April 7, 2003

